

# PATENT COOPERATION TREATY

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## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C. 20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing</b> (day month year) 04 July 2000 (04.07.00)	<b>Applicant's or agent's file reference</b> BB1270 PCT
<b>International application No.</b> PCT/US99/26478	<b>Priority date</b> (day/month/year) 10 November 1998 (10.11.98)
<b>International filing date</b> (day month/year) 09 November 1999 (09.11.99)	
<b>Applicant</b> FAMODU, Omolayo, O. et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
29 May 2000 (29.05.00)

☐ in a notice effecting later election filed with the International Bureau on:  
\_\_\_\_\_

2. The election ☒ was  
☐ was not

made before the expiration of 15 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. (41-22) 740 14 35 Form PCT/IB 331 (July 1992)	<b>Authorized officer</b> Jocelyne Rey-Millet Telephone No. (41-22) 338 83 38
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US9926478

## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

CHRISTENBURY, Lynne, M.  
E.I. du Pont de Nemours and Company  
Legal Patent Center  
1007 Market Street  
Wilmington, DE 19898  
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 04 July 2000 (04.07.00)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference BB1270 PCT	
International application No. PCT/US99/26478	International filing date (day/month/year) 09 November 1999 (09.11.99)

## 1. The following indications appeared on record concerning:

☐ the applicant ☐ the inventor ☒ the agent ☐ the common representative

## Name and Address

FEULNER, Gregory, J.  
E.I. du Pont de Nemours and Company  
Legal Patent Center  
1007 Market Street  
Wilmington, DE 19898  
United States of America

State of Nationality

State of Residence

Telephone No.

302-992-3749

Facsimile No.

302-773-0164

Teleprinter No.

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

## Name and Address

CHRISTENBURY, Lynne, M.  
E.I. du Pont de Nemours and Company  
Legal Patent Center  
1007 Market Street  
Wilmington, DE 19898  
United States of America

State of Nationality

State of Residence

Telephone No.

302-992-5481

Facsimile No.

302-892-7949

Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

☒ the receiving Office ☐ the designated Offices concerned  
☒ the International Searching Authority ☒ the elected Offices concerned  
☒ the International Preliminary Examining Authority ☐ other:

The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Jocelyne Rey-Millet

Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>BB1270 PCT</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No <b>PCT/US 99/ 26478</b>	International filing date (day/month/year) <b>09/11/1999</b>	(Earliest) Priority Date (day/month/year) <b>10/11/1998</b>
Applicant <b>E.I. DU PONT DE NEMOURS AND COMPANY et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 11 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2



**Certain claims were found unsearchable** (See Box I)

3.



**Unity of invention is lacking** (see Box II)

4. With regard to the **title**,

the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.



the text has been established, according to Rule 38 2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

as suggested by the applicant



because the applicant failed to suggest a figure.



because this figure better characterizes the invention



None of the figures.

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US 99/26478

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons

- 1 ☐ Claims Nos  
because they relate to subject matter not required to be searched by this Authority, namely
  
- 2 ☐ Claims Nos  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically
  
- 3 ☐ Claims Nos  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6 4(a)

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows.

see additional sheet

- 1 ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims
  
- 2 ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee
  
- 3 ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos  
11-30,48,49 all completely, and 1-10,41-47,51-57 all partially representing groups 1,5,6,7,and 8
  
- 4 ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims, it is covered by claims Nos

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest
- ☒ No protest accompanied the payment of additional search fees

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding corn arginyl-tRNA synthetase as represented by SEQ ID NOS:1 and 2 or encoding sequences with at least 80% identity to SEQ ID NO:2, polypeptides with at least 80% identity to SEQ ID NO:2, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:23 and 24, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:1 or 23

2. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding rice arginyl-tRNA synthetase as represented by SEQ ID NOS:3 and 4 or encoding sequences with at least 80% identity to SEQ ID NO:4, polypeptides with at least 80% identity to SEQ ID NO:4, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:25 and 26, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:3 or 25

3. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding soybean arginyl-tRNA synthetase as represented by SEQ ID NOS:5 and 6 or encoding sequences with at least 80% identity to SEQ ID NO:6, polypeptides with at least 80% identity to SEQ ID NO:6, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:27 and 28, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:5 or 27

4. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding wheat arginyl-tRNA synthetase as represented by SEQ ID NOS:7 and 8 or encoding sequences with at least 80% identity to SEQ ID NO:8, polypeptides with at least 80% identity to SEQ ID NO:8, expression cassettes, host cells and positive selection

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:29 and 30, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:7 or 29

## 5. Claims: 11-20,41-46,48,51-57 all partially

Polynucleotide sequence encoding corn glutamyl-tRNA synthetase as represented by SEQ ID NOS:9 and 10 or encoding sequences with at least 90% identity to SEQ ID NO:10, polypeptides with at least 90% identity to SEQ ID NO:10, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:9

## 6. Claims: 11-20,41-46,48,51-57 all partially

Polynucleotide sequence encoding rice glutamyl-tRNA synthetase as represented by SEQ ID NOS:11 and 12 or encoding sequences with at least 90% identity to SEQ ID NO:12, polypeptides with at least 90% identity to SEQ ID NO:12, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:31 and 32, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:11 and 31

## 7. Claims: 11-20,41-46,48,51-57 all partially

Polynucleotide sequence encoding soybean glutamyl-tRNA synthetase as represented by SEQ ID NOS:13 and 14 or encoding sequences with at least 90% identity to SEQ ID NO:14, polypeptides with at least 90% identity to SEQ ID NO:14, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:33 and 34, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:13 and 33

## 8. Claims: 21-30,49 all completely, and 41-46, 51-57 all partially

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Polynucleotide sequence encoding wheat glutamyl-tRNA synthetase as represented by SEQ ID NOS:15 and 16 or encoding sequences with at least 80% identity to SEQ ID NO:16, polypeptides with at least 80% identity to SEQ ID NO:16, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NO:15.

## 9. Claims: 31-46,50-57 all partially

Polynucleotide sequence encoding corn histidyl-tRNA synthetase as represented by SEQ ID NOS:17 and 18 or encoding sequences with at least 90% identity to SEQ ID NO:18, polypeptides with at least 90% identity to SEQ ID NO:18, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NO:17.

## 10. Claims: 31-46,50-57 all partially

Polynucleotide sequence encoding soybean histidyl-tRNA synthetase as represented by SEQ ID NOS:19 and 20 or encoding sequences with at least 90% identity to SEQ ID NO:20, polypeptides with at least 90% identity to SEQ ID NO:20, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:35 and 36, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:19 and 35

## 11. Claims: 31-46,50-57 all partially

Polynucleotide sequence encoding wheat histidyl-tRNA synthetase as represented by SEQ ID NOS:21 and 22 or encoding sequences with at least 90% identity to SEQ ID NO:22, polypeptides with at least 90% identity to SEQ ID NO:22, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

synthetases based on said sequences and also SEQ ID NOS:37 and 38, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:21 and 37



## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/82 C12N9/00 C12N15/11 C12N7/00 C12Q1/68  
A01H5/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched: classification system followed by classification symbols

IPC 7 C12N C12Q A01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

BIOSIS, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	SASAKI, T.: DATABASE DBEST ID:36698, 2 December 1993 (1993-12-02), XP002136610  the whole document & EMBL ACCESSION NO:D23310, 28 November 1993 (1993-11-28), ---	1,3,5-8, 10,44, 45,47, 51-53
X	SASAKI, T.: DATABASE DBEST ID:23829, 17 May 1993 (1993-05-17), XP002136611  the whole document & EMBL ACCESSION NO:D16052, 19 May 1993 (1993-05-19), ---  -/--	1,3,5-8, 10,44, 45,47, 51-53



Further documents are listed in the continuation of box C



Patent family members are listed in annex

## Special categories of cited documents

- A document defining the general state of the art which is not considered to be of particular relevance
- E earlier document but published on or after the international filing date
- L document which may throw doubts on priority claims, or which is cited to establish the publication date of another citation or other special reason (as specified)
- O document referring to an oral disclosure, use, exhibition or other means
- P document published prior to the international filing date but later than the priority date claimed

- T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- X document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- Y document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- S document member of the same patent family

Date of the actual completion of the international search

2 August 2000

Date of mailing of the international search report

16.08.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx: 31 651 eponet  
Fax: (+31-70) 340-3016

Authorized officer

Maddox, A

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No
X	ANDERSEN, R.V.: "H.vulgare mRNA for L-Glutamate:tRNA-Glu ligase" EMBL ACCESSION NO: X83523, 21 December 1994 (1994-12-21), XP002136617 the whole document & SWISSPROT ACCESSION NO:Q43768, 1 November 1997 (1997-11-01), ----	11, 13-18, 20,44, 45,47, 50-53
X	SASAKI, T: DATABASE DBEST ID:1195296, 6 August 1997 (1997-08-06), XP002144135  the whole document & SASAKI, T., ET AL.: "Rice cDNA, partial sequence (C50983_2A)." EMBL ACCESSION NO:C27100, 6 August 1997 (1997-08-06), ----	11, 13-18, 20,44, 45,47, 50-53
X	ANDERSEN, R.V., ET AL.: "N.tabacum mRNA for L-Glutamate:tRNA-Glu ligase" EMBL ACCESSION NO:X83524, 21 December 1994 (1994-12-21), XP002136618 the whole document & SWISSPROT ACCESSION NO:Q43794, 1 November 1997 (1997-11-01), ----	11, 13-18, 20,44, 45,47, 50,53
X	RACHER K I ET AL: "EXPRESSION AND CHARACTERIZATION OF A RECOMBINANT YEAST ISOLEUCYL-TRANSFER RNA SYNTHETASE" JOURNAL OF BIOLOGICAL CHEMISTRY 1991, vol. 266, no. 26, 1991, pages 17158-17164. XP002136612 ISSN: 0021-9258 the whole document ----	46
X	EP 0 835 936 A (SMITHKLINE BEECHAM PLC :SMITHKLINE BEECHAM CORP (US)) 15 April 1998 (1998-04-15) the whole document ----	46
P.X	WALBOT, V., ET AL.: "605010D08.y1 605 - Endosperm cDNA library from Schmidt lab Zea mays cDNA, mRNA sequence." EMBL ACCESSION NO:AI795505, 4 July 1999 (1999-07-04), XP002136613 the whole document ----- -/--	1,3,52

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No
P,X	<p>WALBOT, V.: "605028D01.x1 605 - Endosperm cDNA library from Schmidt lab Zea mays cDNA. mRNA sequence."  EMBL ACCESSION NO:AI667809,  17 May 1999 (1999-05-17), XP002144136  the whole document</p> <p>---</p>	<p>11,  13-18,  20,44,  45,47,  50-53</p>
P,X	<p>WING, R.A., ET AL.: "nbxb0083M08f CUGI Rice BAC Library Oryza sativa genomic clone nbxb0083M08f, genomic survey sequence."  EMBL ACCESSION NO:AQ574177,  3 June 1999 (1999-06-03), XP002144137  the whole document</p> <p>---</p>	<p>52</p>
P,X	<p>SHOEMAKER, R., ET AL.: "sb97d10.y1 Gm-c1012 Glycine max cDNA clone GENOME SYSTEMS CLONE ID:Gm-c1012-620 5' similar to SW:SYE_TOBAC Q43794 GLUTAMYL-TRNA SYNTHETASE :.mRNA sequence."  EMBL ACCESSION NO:AI899999,  28 July 1999 (1999-07-28), XP002144138  the whole document</p> <p>---</p>	<p>11,  13-18,  20,44,  45,47,  50-53</p>
A	<p>SMALL, I.D.: "Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G7"  EMBL ACCESSION NO:Z98760,  18 November 1997 (1997-11-18),  XP002136614  the whole document  &amp; TREMBL ACCESSION NO:023247,  1 January 1998 (1998-01-01).</p> <p>---</p>	<p>1-10</p>
A	<p>SMALL, I.D.: "Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G6"  EMBL ACCESSION NO:Z98759,  18 November 1997 (1997-11-18),  XP002136615  the whole document  &amp; TREMBL ACCESSION NO:023246,  1 January 1998 (1998-01-01).</p> <p>---</p>	<p>1-10</p>

-/--

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No
A	<p>DATABASE CHEMABS 'Online!            CHEMICAL ABSTRACTS SERVICE, COLUMBUS,            OHIO, US;            JOACHIMIAK, A. ET AL: "Heparin - Sepharose            column chromatography as a new method for            the purification of aminoacyl- tRNA            synthetases"            retrieved from STN            Database accession no. 94:134720 CA            XP002136622            abstract            &amp; J. CHROMATOGR. (1981), 206(3), 600-5 ,            1981,</p>	10,46
A	<p>DATABASE BIOSIS 'Online!            BIOSCIENCES INFORMATION SERVICE,            PHILADELPHIA, PA, US; 1981            JOACHIMIAK A ET AL: "METHOD FOR ISOLATION            OF AMINOACYL TRANSFER RNA SYNTHETASES            EC-6.1.1.- FROM PLANTS PURIFICATION AND            SOME PROPERTIES OF METHIONYL PHENYL ALANYL            AND ARGINYLYL TRANSFER RNA SYNTHETASES FROM            YELLOW LUPINE LUPINUS-LUTEUS SEEDS"            Database accession no. PREV198172059433            XP002136623            abstract            &amp; INTERNATIONAL JOURNAL OF BIOLOGICAL            MACROMOLECULES 1981,            vol. 3, no. 2, 1981, pages 121-128,            ISSN: 0141-8130</p>	10
A	<p>DAY, I.S., ET AL.: "Arabidopsis thaliana            glutamyl-tRNA synthetase mRNA, complete            cds."            EMBL ACCESSION NO:AF067773,            21 August 1998 (1998-08-21), XP002136616            the whole document            &amp; BIOCHIM. BIOPHYS. ACTA            1399(2-3):219-224(1998).,            20 August 1998 (1998-08-20),            &amp; TREMBL ACCESSION NO:082462,            1 November 1998 (1998-11-01),</p>	11-20
A	<p>WO 97 38718 A (SMITHKLINE BEECHAM PLC            :LAWLOR ELIZABETH JANE (US); SMITHKLINE            BEE) 23 October 1997 (1997-10-23)            the whole document</p>	11-20, 41-46, 48,51-57
A	<p>EP 0 785 261 A (SMITHKLINE BEECHAM PLC)            23 July 1997 (1997-07-23)            the whole document</p>	11-20, 41-46, 48,51-57

-/--

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of the relevant passages	Relevant to claim No
A	<p>AKASHI, K., ET AL.: "O.sativa mRNA histidyl tRNA synthetase" EMBL ACCESSION NO:Z85984, 13 February 1997 (1997-02-13), XP002136619 -&amp; A CDNA CLONE ENCODING RICE HISTIDYL-TRNA SYNTHETASE (ACCESSION NO. Z85984)(PGR97-062)PLANT PHYSIOL. 113:1464-1464(1997)., XP002136620</p> <p>----</p>	
A	<p>AKASHI, K., ET AL.: "Potential dual targeting of an Arabidopsis archaeobacterial-like histidyl-tRNA synthetase to mitochondria and chloroplasts" FEBS LETTERS, vol. 431, no. 1, 10 July 1998 (1998-07-10), pages 39-44, XP002136621 &amp; AKASHI, K., ET AL.: "Arabidopsis thaliana histidyl-tRNA synthetase mRNA, complete cds." EMBL ACCESSION NO:AF020715, 28 September 1998 (1998-09-28), -----</p>	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/26478

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0835936	A	15-04-1998	JP 11098983 A	13-04-1999
WO 9738718	A	23-10-1997	EP 0904103 A	31-03-1999
EP 0785261	A	23-07-1997	WO 9726345 A	24-07-1997
			JP 11503331 T	26-03-1999



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PATENT COOPERATION TREATY

XXI 2001 SF 19

RECEIVED

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

FEB 14 2001

To:

LYNNE M. CHRISTENBURY

PCT

Lynne M. Christenbury  
E.I. DU PONT DE NEMOURS AND COMPANY  
Legal/Patent Records Center  
1007 Market Street  
Wilmington, Delaware 19898  
ETATS-UNIS D'AMERIQUE

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT  
(PCT Rule 71.1)

FAX: 302 892 7949

Date of mailing  
(day/month/year) 16.02.2001

Applicant's or agent's file reference  
BB 1270 PCT

IMPORTANT NOTIFICATION

International application No.  
PCT/US99/26478

International filing date (day/month/year)  
09/11/1999

Priority date (day/month/year)  
10/11/1998

Applicant

E.I. DU PONT DE NEMOURS AND COMPANY et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

**4. REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

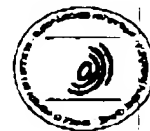
Name and mailing address of the IPEA/

 European Patent Office  
D-80298 Munich  
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Authorized officer

Büchler, S

Tel: +49 89 2399-8090




## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BB1270 PCT		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US99/26478	International filing date (day/month/year) 09/11/1999	Priority date (day/month/year) 10/11/1998	
International Patent Classification (IPC) or national classification and IPC C12N15/82			
Applicant E.I. DU PONT DE NEMOURS AND COMPANY et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 807 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input checked="" type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>			
Date of submission of the demand 29/05/2000		Date of completion of this report 16.02.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel.: +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer  Vix, O  Telephone No.: +49 89 2399 7326	





**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**International application No. **PCT/US99/26478****I. Basis of the report**

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*

**Description, pages:**

1-32 as originally filed

**Claims, No.:**

1-57 as originally filed

**Sequence listing part of the description, pages:**

1-35, as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in written form.
- ☒ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US99/26478

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c));

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 11-40, 48-51 all completely, 41-46, 52-57 all partially.

because:

- ☒ the said International application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):  
**see separate sheet**
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.

# **INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No **PCT/US99/26478**

- ☐ paid additional fees under protest.
- ☒ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
- ☒ not complied with for the following reasons:  
**see separate sheet**
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
- ☐ all parts.
- ☒ the parts relating to claims Nos. 1-10, 41-47, 51-57 all partially.
- V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement**
1. Statement
- |                               |      |        |                    |
|-------------------------------|------|--------|--------------------|
| Novelty (N)                   | Yes: | Claims | 1-10, 41-47, 51-57 |
|                               | No:  | Claims |                    |
| Inventive step (IS)           | Yes: | Claims |                    |
|                               | No:  | Claims | 1-10, 41-47, 51-57 |
| Industrial applicability (IA) | Yes: | Claims | 1-10, 41-47, 51-57 |
|                               | No:  | Claims |                    |
2. Citations and explanations  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
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**Re Item III****Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

Since the applicant has not availed himself of a possibility to have the different searched inventions examined, the examination will be restricted to the first invention mentioned in the ISR).

**Re Item IV****Lack of unity of invention**

The applicant did not respond to the invitation to pay additional examination fees corresponding to the different groups of inventions that have been searched by the ISA. Therefore, the first group of invention will be examined, namely:

(1). Claims: 1-10, 41-47, 51-57 all partially

Polynucleotides sequence encoding corn arginyl-tRNA synthetase as represented by SEQ ID N°:1, and the encoded polypeptide represented by SEQ ID N°:2, or other DNA sequences encoding for polypeptides with at least 80% identity to SEQ ID N°2, polypeptides with at least 80% identity to SEQ ID N°2, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining amino-acyl tRNA synthetases and evaluating compounds for the ability to inhibit amino-acyl tRNA synthetases based on said sequences and also SEQ ID N°: 23-24, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID N°:1 or 23.

**Re Item V****Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1. SASAKI, T.: DATABASE DBEST ID:36698, 2 December 1993 (1993-12-02), XP002136610 & EMBL ACCESSION NO:D23310, 28 November 1993 (1993-11-28),

## INTERNATIONAL PRELIMINARY

International application No PCT/US99/26478

## EXAMINATION REPORT - SEPARATE SHEET

- D2: SASAKI, T.: DATABASE DBEST ID:23829, 17 May 1993 (1993-05-17), XP002136611 & EMBL ACCESSION NO:D16052, 19 May 1993 (1993-05-19),
- D3: EP-A-0 835 936 (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 15 April 1998 (1998-04-15)
- D4: SMALL, I.D.: 'Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G7' EMBL ACCESSION NO:Z98760, 18 November 1997 (1997-11-18), XP002136614 & TREMBL ACCESSION NO:O23247, 1 January 1998 (1998-01-01),
- D5: SMALL, I.D.: 'Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G6' EMBL ACCESSION NO:Z98759, 18 November 1997 (1997-11-18), XP002136615 & TREMBL ACCESSION NO:O23246, 1 January 1998 (1998-01-01),
- D6: DATABASE CHEMABS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; JOACHIMIAK, A. ET AL: 'Heparin - Sepharose column chromatography as a new method for the purification of aminoacyl- tRNA synthetases' retrieved from STN Database accession no. 94:134720 CA XP002136622 & J. CHROMATOGR. (1981), 206(3), 600-5 , 1981
- D7: AKASHI, K., ET AL.: 'O.sativa mRNA histidyl tRNA synthetase' EMBL ACCESSION NO:Z85984, 13 February 1997 (1997-02-13), XP002136619 -& A CDNA CLONE ENCODING RICE HISTIDYL-TRNA SYNTHETASE (ACCESSION NO. Z85984)(PGR97-062)PLANT PHYSIOL. 113:1464-1464(1997),.

## 2. Novelty (Art. 33(2) PCT)

Amino-tRNA Synthetases (AARS) are enzymes responsible for the charge of specific tRNAs with their appropriate amino-acid. A variety of AARS and plant ESTs (as in D1-D2) are known in the field of plant biology. Concerning the subject-matter of claims 1-10 dealing with corn arginyl-tRNA synthetase, no specific arginyl-RS isolated sequences were found in the available prior presenting a high level of identity. Known argRS sequences are derived from micro-organisms (e.g. in D3) or from plants other than corn (like Arabidopsis thaliana in D4-D5). However, concerning the polypeptides corresponding to arginyl-RS with at least 80% identity when compared to SEQ ID N°:2, novelty might become questionable in view of other known plant arginyl-tRNA synthetases. The one isolated from Arabidopsis thaliana (D4-D5) shows 75% identity.

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EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US99/26478

**3. Inventive step (Art. 33(3) PCT)**

Aminoacyl-tRNA Synthetases (AARS) are enzymes responsible for the charge of specific tRNAs with their appropriate amino-acid. The subject-matter of claims 1-10 relates to corn arginyl-tRNA synthetase enzymes.

Different specific AARS and plant ESTs (as in D1-D2) are known in the field of plant biology such as arginyl-RS from *Arabidopsis thaliana* in D4-D5, or other specific amino-acyl tRNA synthetases (such as Histidyl-RS from rice, glutamyl-RS from rice or barley, etc...)

The problem to be solved by the present invention may therefore be regarded as the provision of a further arginyl-tRNA synthetase selected from corn.

The solution provided by the present application is the polynucleotides sequence SEQ ID N°:1 and its encoded polypeptide of SEQ ID N°: 2 or any polypeptide of at least 240 amino-acids that has at least 80% identity (based on the Clustal method of alignment).

Due to the conserved structural motifs among the AARS families and the general knowledge in the field of plant AARS (central role in the cell biosynthesis and common ancestors in the plant evolution), and in absence of any new technical effects, the presence of an inventive step is questionable since it appears to have been obvious to a person skilled in the art to arrive at the claimed subject-matter using routine methods:

The skilled person in the field of plant molecular biology willing to solve the technical problem would look for a known arginyl-RS within plants in order to have an appropriate molecular "probe" to screen "in silico" sequences obtained from corn cDNAs. D4 or D5 provide such a specific arg-RS from *Arabidopsis thaliana* which can be used as a "probe" for sequence alignment with corn cDNAs or ESTs. An example of such a routine strategy can be found in D7 : the authors analysed a cDNA clone encoding a rice histidyl-RS based on his-RS motif conservation and sequence alignment with other known histidyl-RS.

In the present case, obtaining a cDNA library from corn and partially sequencing these sequences is also within the easy reach of the man skilled in the art. The common analysis tools provided by the scientific community (ex. BLAST for

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EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US99/26478

nucleotide sequence alignment) allow to compare those cDNAs sequences with the arginyl-RS nucleotide sequence from *Arabidopsis thaliana* disclosed in D4-D5. Consequently, the man skilled in the art would have a high probability of success for selecting a cDNA clone corresponding to the arginyl-RS from corn by selecting the sequence corresponding to the highest score after sequence alignment with arg-RS from *Arabidopsis*. From D3, it also appears that the use of AARS in host-cell expression, diagnostic assays (D3 page 16), compositions, and methods of screening for arg-RS antagonists and agonists (D3, page 18) are obvious embodiments in the field of AARS.

Therefore, no inventive step can be acknowledged for the claims 1-10, 41-47, 51-57. Consequently, these claims do not meet the requirements of Article 33(3) PCT

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference BB1270 PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/26478	International filing date (day/month/year) 09/11/1999	Priority date (day/month/year) 10/11/1998
International Patent Classification (IPC) or national classification and IPC C12N15/82		
Applicant E.I. DU PONT DE NEMOURS AND COMPANY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 8 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  29/05/2000	Date of completion of this report  16.02.2001
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax +49 89 2399 - 4465	Authorized officer  Vix. O  Telephone No. +49 89 2399 7326  



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/26478

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).)*:

### Description, pages:

1-32 as originally filed

### Claims, No.:

1-57 as originally filed

### Sequence listing part of the description, pages:

1-35, as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in written form.
- ☒ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/26478

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

### III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 11-40, 48-51 all completely, 41-46, 52-57 all partially.

because:

- ☒ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):  
**see separate sheet**
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

- ☐ the written form has not been furnished or does not comply with the standard.
- ☐ the computer readable form has not been furnished or does not comply with the standard.

### IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/US99/26478

- ☐ paid additional fees under protest.
- ☒ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
- ☒ not complied with for the following reasons:  
**see separate sheet**
4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:
- ☐ all parts.
- ☒ the parts relating to claims Nos. 1-10, 41-47, 51-57 all partially.

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	1-10, 41-47, 51-57
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-10, 41-47, 51-57
Industrial applicability (IA)	Yes:	Claims	1-10, 41-47, 51-57
	No:	Claims	

### 2. Citations and explanations **see separate sheet**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

Since the applicant has not availed himself of a possibility to have the different searched inventions examined, the examination will be restricted to the first invention mentioned in the ISR).

**Re Item IV**

**Lack of unity of invention**

The applicant did not respond to the invitation to pay additional examination fees corresponding to the different groups of inventions that have been searched by the ISA. Therefore, the first group of invention will be examined, namely:

(1). Claims: 1-10, 41-47, 51-57 all partially

Polynucleotides sequence encoding corn arginyl-tRNA synthetase as represented by SEQ ID N°:1, and the encoded polypeptide represented by SEQ ID N°:2, or other DNA sequences encoding for polypeptides with at least 80% identity to SEQ ID N°2, polypeptides with at least 80% identity to SEQ ID N°2, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining amino-acyl tRNA synthetases and evaluating compounds for the ability to inhibit amino-acyl tRNA synthetases based on said sequences and also SEQ ID N°: 23-24, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID N°:1 or 23.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: SASAKI, T.: DATABASE DBEST ID:36698, 2 December 1993 (1993-12-02), XP002136610 & EMBL ACCESSION NO:D23310, 28 November 1993 (1993-11-28).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/US99/26478

- D2: SASAKI, T.: DATABASE DBEST ID:23829, 17 May 1993 (1993-05-17), XP002136611 & EMBL ACCESSION NO:D16052, 19 May 1993 (1993-05-19),
- D3: EP-A-0 835 936 (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 15 April 1998 (1998-04-15)
- D4: SMALL, I.D.: 'Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G7' EMBL ACCESSION NO:Z98760, 18 November 1997 (1997-11-18), XP002136614 & TREMBL ACCESSION NO:O23247, 1 January 1998 (1998-01-01),
- D5: SMALL, I.D.: 'Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G6' EMBL ACCESSION NO:Z98759, 18 November 1997 (1997-11-18), XP002136615 & TREMBL ACCESSION NO:O23246, 1 January 1998 (1998-01-01),
- D6: DATABASE CHEMABS [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; JOACHIMIAK, A. ET AL: 'Heparin - Sepharose column chromatography as a new method for the purification of aminoacyl- tRNA synthetases' retrieved from STN Database accession no. 94:134720 CA XP002136622 & J. CHROMATOGR. (1981), 206(3), 600-5 , 1981
- D7: AKASHI, K., ET AL.: 'O.sativa mRNA histidyl tRNA synthetase' EMBL ACCESSION NO:Z85984, 13 February 1997 (1997-02-13), XP002136619 -& A CDNA CLONE ENCODING RICE HISTIDYL-TRNA SYNTHETASE (ACCESSION NO. Z85984)(PGR97-062)PLANT PHYSIOL. 113:1464-1464(1997).,

2. Novelty (Art. 33(2) PCT)

Amino-tRNA Synthetases (AARS) are enzymes responsible for the charge of specific tRNAs with their appropriate amino-acid. A variety of AARS and plant ESTs (as in D1-D2) are known in the field of plant biology. Concerning the subject-matter of claims 1-10 dealing with corn arginyl-tRNA synthetase, no specific arginyl-RS isolated sequences were found in the available prior presenting a high level of identity. Known argRS sequences are derived from micro-organisms (e.g. in D3) or from plants other than corn (like Arabidopsis thaliana in D4-D5). However, concerning the polypeptides corresponding to arginyl-RS with at least 80% identity when compared to SEQ ID N°:2, novelty might become questionable in view of other known plant arginyl-tRNA synthetases. The one isolated from Arabidopsis thaliana (D4-D5) shows 75% identity.

3. Inventive step (Art. 33(3) PCT)

Aminoacyl-tRNA Synthetases (AARS) are enzymes responsible for the charge of specific tRNAs with their appropriate amino-acid. The subject-matter of claims 1-10 relates to corn arginyl-tRNA synthetase enzymes.

Different specific AARS and plant ESTs (as in D1-D2) are known in the field of plant biology such as arginyl-RS from *Arabidopsis thaliana* in D4-D5, or other specific amino-acyl tRNA synthetases (such as Histidyl-RS from rice, glutamyl-RS from rice or barley, etc...).

The problem to be solved by the present invention may therefore be regarded as the provision of a further arginyl-tRNA synthetase selected from corn.

The solution provided by the present application is the polynucleotides sequence SEQ ID N°:1 and its encoded polypeptide of SEQ ID N°: 2 or any polypeptide of at least 240 amino-acids that has at least 80% identity (based on the Clustal method of alignment).

Due to the conserved structural motifs among the AARS families and the general knowledge in the field of plant AARS (central role in the cell biosynthesis and common ancestors in the plant evolution), and in absence of any new technical effects, the presence of an inventive step is questionable since it appears to have been obvious to a person skilled in the art to arrive at the claimed subject-matter using routine methods:

The skilled person in the field of plant molecular biology willing to solve the technical problem would look for a known arginyl-RS within plants in order to have an appropriate molecular "probe" to screen "in silico" sequences obtained from corn cDNAs. D4 or D5 provide such a specific arg-RS from *Arabidopsis thaliana* which can be used as a "probe" for sequence alignment with corn cDNAs or ESTs. An example of such a routine strategy can be found in D7 : the authors analysed a cDNA clone encoding a rice histidyl-RS based on his-RS motif conservation and sequence alignment with other known histidyl-RS.

In the present case, obtaining a cDNA library from corn and partially sequencing these sequences is also within the easy reach of the man skilled in the art. The common analysis tools provided by the scientific community (ex. BLAST for

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EXAMINATION REPORT - SEPARATE SHEET**

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nucleotide sequence alignment) allow to compare those cDNAs sequences with the arginyl-RS nucleotide sequence from *Arabidopsis thaliana* disclosed in D4-D5. Consequently, the man skilled in the art would have a high probability of success for selecting a cDNA clone corresponding to the arginyl-RS from corn by selecting the sequence corresponding to the highest score after sequence alignment with arg-RS from *Arabidopsis*. From D3, it also appears that the use of AARS in host-cell expression, diagnostic assays (D3 page 16), compositions, and methods of screening for arg-RS antagonists and agonists (D3, page 18) are obvious embodiments in the field of AARS.

Therefore, no inventive step can be acknowledged for the claims 1-10, 41-47, 51-57. Consequently, these claims do not meet the requirements of Article 33(3) PCT.

# PATENT COOPERATION TREATY

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From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

To

E.I. DU PONT DE NEMOURS AND COMPANY  
Legal/Patent Records Center  
Attn. CHRISTENBURY, Lynne.  
1007 Market Street  
Wilmington, Delaware 19898  
UNITED STATES OF AMERICA

W.R.M?

Date of mailing  
(day month/year)

16/08/2000

Applicant's or agent's file reference

BB1270 PCT

FOR FURTHER ACTION

See paragraphs 1 and 4 below

International application No

PCT/US 99/26478

International filing date

(day/month/year)

09/11/1999

Applicant

E.I. DU PONT DE NEMOURS AND COMPANY et al.

- 1 ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46)

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report, however, for more details, see the notes on the accompanying sheet

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No (41-22) 740.14.35

IRB NOTED

For more detailed instructions, see the notes on the accompanying sheet.

- 2 ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith

- 3 ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest, the applicant will be notified as soon as a decision is made

- 4 **Further action(s):** The applicant is reminded of the following

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis 1 and 90bis 3, respectively, before the completion of the technical preparations for international publication

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later)

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel (+31-70) 340-2040, Tx 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Andria Overbeeke-Siepkens



## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

#### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

#### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

**The amendments must be made in the language in which the international application is to be published.**

#### What documents must accompany the amendments?

##### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

**The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.**

## NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged,
- (ii) the claim is cancelled,
- (iii) the claim is new,
- (iv) the claim replaces one or more claims as filed,
- (v) the claim is the result of the division of a claim as filed

**The following examples illustrate the manner in which amendments must be explained in the accompanying letter:**

- 1 [Where originally there were 48 claims and after amendment of some claims there are 51]  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers, claims 30, 33 and 36 unchanged, new claims 49 to 51 added"
- 2 [Where originally there were 15 claims and after amendment of all claims there are 11]  
"Claims 1 to 15 replaced by amended claims 1 to 11"
- 3 [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]  
"Claims 1 to 6 and 14 unchanged, claims 7 to 13 cancelled, new claims 15, 16 and 17 added" or  
"Claims 7 to 13 cancelled, new claims 15, 16 and 17 added, all other claims unchanged"
- 4 [Where various kinds of amendments are made]  
"Claims 1-10 unchanged, claims 11 to 13, 18 and 19 cancelled, claims 14, 15 and 16 replaced by amended claim 14, claim 17 subdivided into amended claims 15, 16 and 17, new claims 20 and 21 added."

### **"Statement under article 19(1)" (Rule 46.4)**

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1))

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international application is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)"

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim

### **Consequence if a demand for international preliminary examination has already been filed**

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the procedure before that Authority (see Rules 55 3(a) and 62 2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401)

### **Consequence with regard to translation of the international application for entry into the national phase**

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>BB1270 PCT</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below	
International application No <b>PCT/US 99/ 26478</b>	International filing date ( <i>day/month/year</i> ) <b>09/11/1999</b>	(Earliest) Priority Date ( <i>day/month/year</i> ) <b>10/11/1998</b>
Applicant  <b>E.I. DU PONT DE NEMOURS AND COMPANY et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau

This International Search Report consists of a total of 11 sheets



It is also accompanied by a copy of each prior art document cited in this report.

**1 Basis of the report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23 1(b))

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing



contained in the international application in written form



filed together with the international application in computer readable form



furnished subsequently to this Authority in written form



furnished subsequently to this Authority in computer readable form



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2



**Certain claims were found unsearchable** (See Box I)

3



**Unity of invention is lacking** (see Box II)

**4 With regard to the title,**



the text is approved as submitted by the applicant



the text has been established by this Authority to read as follows

**5 With regard to the abstract,**



the text is approved as submitted by the applicant



the text has been established, according to Rule 38 2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority

**6 The figure of the drawings to be published with the abstract is Figure No**



as suggested by the applicant



because the applicant failed to suggest a figure



because this figure better characterizes the invention



None of the figures

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US 99/26478

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons

- 1 ☐ Claims Nos  
because they relate to subject matter not required to be searched by this Authority, namely
- 2 ☐ Claims Nos  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically
- 3 ☐ Claims Nos  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6 4(a)

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows

see additional sheet

- 1 ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims
- 2 ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee
- 3 ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos  
11-30,48,49 all completely, and 1-10,41-47,51-57 all partially representing groups 1,5,6,7,and 8
- 4 ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims, it is covered by claims Nos

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest
- ☒ No protest accompanied the payment of additional search fees

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding corn arginyl-tRNA synthetase as represented by SEQ ID NOS:1 and 2 or encoding sequences with at least 80% identity to SEQ ID NO:2, polypeptides with at least 80% identity to SEQ ID NO:2, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:23 and 24, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:1 or 23

2. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding rice arginyl-tRNA synthetase as represented by SEQ ID NOS:3 and 4 or encoding sequences with at least 80% identity to SEQ ID NO:4, polypeptides with at least 80% identity to SEQ ID NO:4, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:25 and 26, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:3 or 25

3. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding soybean arginyl-tRNA synthetase as represented by SEQ ID NOS:5 and 6 or encoding sequences with at least 80% identity to SEQ ID NO:6, polypeptides with at least 80% identity to SEQ ID NO:6, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:27 and 28, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:5 or 27

4. Claims: 1-10,41-47,51-57 all partially

Polynucleotide sequence encoding wheat arginyl-tRNA synthetase as represented by SEQ ID NOS:7 and 8 or encoding sequences with at least 80% identity to SEQ ID NO:8, polypeptides with at least 80% identity to SEQ ID NO:8, expression cassettes, host cells and positive selection

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:29 and 30, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:7 or 29

## 5. Claims: 11-20, 41-46, 48, 51-57 all partially

Polynucleotide sequence encoding corn glutamyl-tRNA synthetase as represented by SEQ ID NOS:9 and 10 or encoding sequences with at least 90% identity to SEQ ID NO:10, polypeptides with at least 90% identity to SEQ ID NO:10, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:9

## 6. Claims: 11-20, 41-46, 48, 51-57 all partially

Polynucleotide sequence encoding rice glutamyl-tRNA synthetase as represented by SEQ ID NOS:11 and 12 or encoding sequences with at least 90% identity to SEQ ID NO:12, polypeptides with at least 90% identity to SEQ ID NO:12, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:31 and 32, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:11 and 31

## 7. Claims: 11-20, 41-46, 48, 51-57 all partially

Polynucleotide sequence encoding soybean glutamyl-tRNA synthetase as represented by SEQ ID NOS:13 and 14 or encoding sequences with at least 90% identity to SEQ ID NO:14, polypeptides with at least 90% identity to SEQ ID NO:14, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:33 and 34, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:13 and 33

## 8. Claims: 21-30, 49 all completely, and 41-46, 51-57 all partially

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Polynucleotide sequence encoding wheat glutamyl-tRNA synthetase as represented by SEQ ID NOS:15 and 16 or encoding sequences with at least 80% identity to SEQ ID NO:16, polypeptides with at least 80% identity to SEQ ID NO:16, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NO:15.

9. Claims: 31-46, 50-57 all partially

Polynucleotide sequence encoding corn histidyl-tRNA synthetase as represented by SEQ ID NOS:17 and 18 or encoding sequences with at least 90% identity to SEQ ID NO:18, polypeptides with at least 90% identity to SEQ ID NO:18, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NO:17.

10. Claims: 31-46, 50-57 all partially

Polynucleotide sequence encoding soybean histidyl-tRNA synthetase as represented by SEQ ID NOS:19 and 20 or encoding sequences with at least 90% identity to SEQ ID NO:20, polypeptides with at least 90% identity to SEQ ID NO:20, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA synthetases based on said sequences and also SEQ ID NOS:35 and 36, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:19 and 35

11. Claims: 31-46, 50-57 all partially

Polynucleotide sequence encoding wheat histidyl-tRNA synthetase as represented by SEQ ID NOS:21 and 22 or encoding sequences with at least 90% identity to SEQ ID NO:22, polypeptides with at least 90% identity to SEQ ID NO:22, expression cassettes, host cells and positive selection methods based on said sequences, methods for selecting and obtaining aminoacyl-tRNA synthetases and evaluating compounds for the ability to inhibit aminoacyl-tRNA

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

synthetases based on said sequences and also SEQ ID NOS:37 and 38, polynucleotides comprising at least 30 consecutive nucleotides of SEQ ID NOS:21 and 37



## INTERNATIONAL SEARCH REPORT

National Application No  
PCT/US 99/26478

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/82 C12N9/00 C12N15/11 C12N7/00 C12Q1/68  
A01H5/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C12Q A01H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

BIOSIS, CHEM ABS Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	SASAKI, T.: DATABASE DBEST ID:36698, 2 December 1993 (1993-12-02), XP002136610  the whole document & EMBL ACCESSION NO:D23310, 28 November 1993 (1993-11-28), ---	1,3,5-8, 10,44, 45,47, 51-53
X	SASAKI, T.: DATABASE DBEST ID:23829, 17 May 1993 (1993-05-17), XP002136611  the whole document & EMBL ACCESSION NO:D16052, 19 May 1993 (1993-05-19), ---	1,3,5-8, 10,44, 45,47, 51-53
	--- -/-	

☒ Further documents are listed in the continuation of box C

☒ Patent family members are listed in annex

## \* Special categories of cited documents

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- \* & \* document member of the same patent family

Date of the actual completion of the international search

2 August 2000

Date of mailing of the international search report

16.08.00

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl,  
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Authorized officer

Maddox, A

## INTERNATIONAL SEARCH REPORT

National Application No  
PCT/US 99/26478

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	ANDERSEN, R.V.: "H.vulgare mRNA for L-Glutamate:tRNA-Glu ligase" EMBL ACCESSION NO: X83523, 21 December 1994 (1994-12-21), XP002136617 the whole document & SWISSPROT ACCESSION NO:Q43768, 1 November 1997 (1997-11-01), ---	11, 13-18, 20,44, 45,47, 50-53
X	SASAKI, T: DATABASE DBEST ID:1195296, 6 August 1997 (1997-08-06), XP002144135  the whole document & SASAKI, T., ET AL.: "Rice cDNA, partial sequence (C50983_2A)." EMBL ACCESSION NO:C27100, 6 August 1997 (1997-08-06), ---	11, 13-18, 20,44, 45,47, 50-53
X	ANDERSEN, R.V., ET AL.: "N.tabacum mRNA for L-Glutamate:tRNA-Glu ligase" EMBL ACCESSION NO:X83524, 21 December 1994 (1994-12-21), XP002136618 the whole document & SWISSPROT ACCESSION NO:Q43794, 1 November 1997 (1997-11-01), ---	11, 13-18, 20,44, 45,47, 50,53
X	RACHER K I ET AL: "EXPRESSION AND CHARACTERIZATION OF A RECOMBINANT YEAST ISOLEUCYL-TRANSFER RNA SYNTHETASE" JOURNAL OF BIOLOGICAL CHEMISTRY 1991, vol. 266, no. 26, 1991, pages 17158-17164, XP002136612 ISSN: 0021-9258 the whole document ---	46
X	EP 0 835 936 A (SMITHKLINE BEECHAM PLC ;SMITHKLINE BEECHAM CORP (US)) 15 April 1998 (1998-04-15) the whole document ---	46
P,X	WALBOT, V., ET AL.: "605010D08.y1 605 - Endosperm cDNA library from Schmidt lab Zea mays cDNA, mRNA sequence." EMBL ACCESSION NO:AI795505, 4 July 1999 (1999-07-04), XP002136613 the whole document ---	1,3,52
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## INTERNATIONAL SEARCH REPORT

National Application No

PCT/US 99/26478

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
P,X	WALBOT, V.: "605028D01.x1 605 - Endosperm cDNA library from Schmidt lab Zea mays cDNA, mRNA sequence." EMBL ACCESSION NO:AI667809, 17 May 1999 (1999-05-17), XP002144136 the whole document	11, 13-18, 20,44, 45,47, 50-53
P,X	--- WING, R.A., ET AL.: "nbxb0083M08f CUGI Rice BAC Library Oryza sativa genomic clone nbxb0083M08f, genomic survey sequence." EMBL ACCESSION NO:AQ574177, 3 June 1999 (1999-06-03), XP002144137 the whole document	52
P,X	--- SHOEMAKER, R., ET AL.: "sb97d10.y1 Gm-cl012 Glycine max cDNA clone GENOME SYSTEMS CLONE ID:Gm-cl012-620 5' similar to SW:SYE TOBAC Q43794 GLUTAMYL-TRNA SYNTHETASE ;,mRNA sequence." EMBL ACCESSION NO:AI899999, 28 July 1999 (1999-07-28), XP002144138 the whole document	11, 13-18, 20,44, 45,47, 50-53
A	--- SMALL, I.D.: "Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G7" EMBL ACCESSION NO:Z98760, 18 November 1997 (1997-11-18), XP002136614 the whole document & TREMBL ACCESSION NO:023247, 1 January 1998 (1998-01-01), ---	1-10
A	--- SMALL, I.D.: "Arabidopsis thaliana gene encoding arginyl-tRNA synthetase, clone G6" EMBL ACCESSION NO:Z98759, 18 November 1997 (1997-11-18), XP002136615 the whole document & TREMBL ACCESSION NO:023246, 1 January 1998 (1998-01-01), ---	1-10
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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	<p>DATABASE CHEMABS [Online]            CHEMICAL ABSTRACTS SERVICE, COLUMBUS,            OHIO, US;            JOACHIMIAK, A. ET AL: "Heparin - Sepharose            column chromatography as a new method for            the purification of aminoacyl- tRNA            synthetases"            retrieved from STN            Database accession no. 94:134720 CA            XP002136622            abstract            &amp; J. CHROMATOGR. (1981), 206(3), 600-5 ,            1981,</p>	10,46
A	<p>---            DATABASE BIOSIS [Online]            BIOSCIENCES INFORMATION SERVICE,            PHILADELPHIA, PA, US; 1981            JOACHIMIAK A ET AL: "METHOD FOR ISOLATION            OF AMINOACYL TRANSFER RNA SYNTHETASES            EC-6.1.1.- FROM PLANTS PURIFICATION AND            SOME PROPERTIES OF METHIONYL PHENYL ALANYL            AND ARGINYL TRANSFER RNA SYNTHETASES FROM            YELLOW LUPINE LUPINUS-LUTEUS SEEDS"            Database accession no. PREV198172059433            XP002136623            abstract            &amp; INTERNATIONAL JOURNAL OF BIOLOGICAL            MACROMOLECULES 1981,            vol. 3, no. 2, 1981, pages 121-128,            ISSN: 0141-8130</p>	10
A	<p>---            DAY, I.S., ET AL.: "Arabidopsis thaliana            glutamyl-tRNA synthetase mRNA, complete            cds."            EMBL ACCESSION NO:AF067773,            21 August 1998 (1998-08-21), XP002136616            the whole document            &amp; BIOCHIM. BIOPHYS. ACTA            1399(2-3):219-224(1998).,            20 August 1998 (1998-08-20),            &amp; TREMBL ACCESSION NO:082462,            1 November 1998 (1998-11-01),</p>	11-20
A	<p>---            WO 97 38718 A (SMITHKLINE BEECHAM PLC            ;LAWLOR ELIZABETH JANE (US); SMITHKLINE            BEE) 23 October 1997 (1997-10-23)            the whole document</p>	11-20, 41-46, 48,51-57
A	<p>---            EP 0 785 261 A (SMITHKLINE BEECHAM PLC)            23 July 1997 (1997-07-23)            the whole document</p> <p style="text-align: center;">---</p> <p style="text-align: center;">-/--</p>	11-20, 41-46, 48,51-57

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/26478

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category <sup>2</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
A	AKASHI, K., ET AL.: "O.sativa mRNA histidyl tRNA synthetase" EMBL ACCESSION NO:Z85984, 13 February 1997 (1997-02-13), XP002136619 -& A CDNA CLONE ENCODING RICE HISTIDYL-TRNA SYNTHETASE (ACCESSION NO. Z85984)(PGR97-062)PLANT PHYSIOL. 113:1464-1464(1997)., XP002136620	
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